

Top 5 Student Mistakes: 5.1/5.3 Quiz

1) Improper expansion of log rules. Follow the correct expansion rules:

$$\ln(ab) = \ln(a) + \ln(b) . \text{ Remember, there are no expansion rules for } \ln(a+b)$$

$$\ln(a+b) \neq \ln a + \ln b \quad (\text{example: } \ln(5+4x) \neq \ln(5) + \ln(4x))$$

2) Forgetting to expand log problem before finding derivative.

3) Log differentiation mistakes

a. Incorrectly applying log differentiation to a problem that already has logs in the problem.

b. Not knowing when to apply log differentiation: $(y = x^{3x+5})$

c. Forgetting to apply derivative product rule for the above log differentiation problem.

4) Forgetting Domain/Range properties of parent graphs $(y = \ln(x) \text{ and } y = \sqrt{x})$

5) Not knowing how to establish relationships between ordered pairs and slopes regarding a function and its inverse function

Basically, know how to use the below table/chart to find $(f^{-1})'(a)$

Evaluate derivative of inverse at a point: (find $(f^{-1})'(a)$)

$f(b) = a$	$(f^{-1})(a) = b$
$f'(b) = n$	$(f^{-1})'(a) = \frac{1}{n}$

Top 5 5.4-5.5 Quiz Mistakes

1. Students confusing rules between $\frac{d}{dx} e^u$, $\frac{d}{dx} \ln u$, $\frac{d}{dx} \log_a u$, and $\frac{d}{dx} a^u$

a. For example $\frac{d}{dx} e^{3x-2x^4} \neq e^{3x-2x^4} * \left(\frac{3-8x}{3x-2x^4}\right)$

2. Students expanding problem that is not log expression

3. Incorrectly applying derivative power rule with log power property

a. $\frac{d}{dx} \ln(3 - 5x^3)^{\frac{4}{3}} \neq \frac{4}{3} \ln(3 - 5x^3)^{\frac{1}{3}} * (-15x^2)$

4. Careless mistakes forgetting $(\ln a)$ for $\frac{d}{dx} \log_a u$, and $\frac{d}{dx} a^u$ derivative rules

5. Forgetting location of $(\ln a)$ for $\frac{d}{dx} \log_a u = \frac{1}{\ln a} * \frac{u'}{u}$, and $\frac{d}{dx} a^u = \ln a * a^u * u'$ derivative rules

Top 5 Mistakes: Ch. 5 Exponential/Logs Test

1. Not knowing how to interpret (given time t) determining velocity increase/decrease vs. speed increasing/decreasing
2. Mistakes throughout the curve sketching problem
 - a. Forgetting how to approximate values for $\ln x$. Memorize the $y = \ln x$ parent graph (For instance: $\ln(0) = ___$, $\ln(-3) = ___$, $\ln(1) = ___$
 $\ln(2) \approx ___$, $\ln(e) = ___$, $\ln(3) \approx ___$, $\ln(1/3) \approx ___$)
 - b. Following through with all the steps for first derivative test, concavity test, justification
 - c. Applying sign lines
 - d. Sketch graph according to the sign lines.
3. Forgetting to apply log expansion for log expressions before finding derivative
4. Applying implicit differentiation appropriately, correctly
5. Not knowing when to apply log differentiation and/or making mistakes within log differentiation